THE AIR TOXICS PROGRAM

What are air toxics?

- Pollutants which...
  - may cause cancer or other serious health effects in humans or in the environment from both short and long term exposure
  - may disperse locally, regionally, nationally, or globally
  - after deposition may persist in the environment and/or bioaccumulate in the food chair
  - possess a variety of physical and chemical characteristics that enhance potential for multi-media exposure

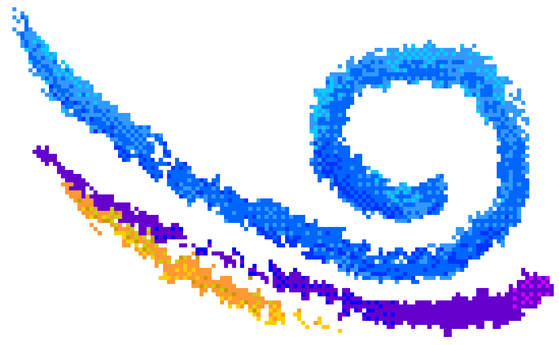
- 188 compounds listed in the Clean Air Act

What health & environmental effects do they cause?

- More than half are known or suspected to be human carcinogens
- Many known to affect respiratory, neurologic, immune, hormonal, or reproductive systems
- More susceptible or sensitive populations at greater risk
- Known to have similar effects in many fish and animal species
- Environmental effects may be felt by individual species within ecosystem or by entire ecosystem where affected species are found

Source of air toxics

- Literally, thousands of sources
- Stationary sources include large industrial complexes
  - chemical plants, oil refineries, and steel mills
- Area sources which are small stationary sources
  - dry cleaners, gas stations, and small manufacturers
- Mobile sources
  - on-road vehicles - cars, trucks, and buses
  - non-road vehicles - ships, lawn mowers, and farm equipment



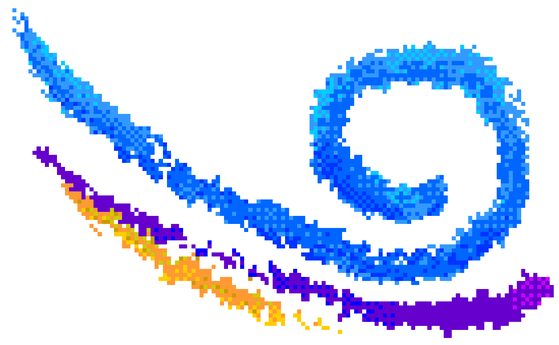
History of the Program

1970 CAA Section 112 Provisions

- Directed EPA to identify air pollutants with hazardous effects and establish standards to prevent any adverse effects "with an ample margin of safety"

- Prior to 1990, EPA set standards for only 8 pollutants:

arsenic	beryllium	radon
asbestos	mercury	radionuclides
benzene	vinyl chloride	



Section 112: Statutory Provisions

- Sec 112(a) Definitions
- Sec 112(b) List of Pollutants
- Sec 112(c) List of Source Categories
- Sec 112(d) Emission Standards
- Sec 112(e) Schedule for Standards & Review
- Sec 112(f) Protect Health & Enviro Standard
- Sec 112(g) Modifications
- Sec 112(h) Work Practice Standards
- Sec 112(i) Schedule for Compliance
- Sec 112(j) Equiv. Emission Limitation by Permit

Section 112: Statutory Provisions *(continued)*

- Sec 112(k) Area Source Program
- Sec 112(l) State Programs
- Sec 112(m) Atmospheric Deposition to Great Lakes & Coastal Waters
- Sec 112(n) Other Provisions
- Sec 112(o) National Academy of Sciences Study
- Sec 112(p) Mickey Leland Urban Air Toxics Rsh Ctr
- Sec 112(q) Savings Provision
- Sec 112(r) Prevention of Accidental Releases
- Sec 112(s) Periodic Report

Air Toxics Provisions

- Statutory list of 189 HAPs
  - EPA can delete or add to list
- List of categories of industrial facilities emitting substantial quantities of HAPs
- Establish MACT for each category
- Expected significant reductions below existing emission limits
- All standards must be promulgated by November 15, 2000

Source Category List

- Section 112(c) requires list of major sources emitting:
  - >10 tons/year of one pollutant
  - >25 tons/year of a combination of pollutants
- EPA published initial list July 16, 1992
  - 166 categories of major sources
  - 8 categories of area sources
- List can be revised
- Urban strategy will add more area sources

National Standards

- Section 112(d)
  - For new sources, best controlled similar source
  - For existing sources, the average emission limitation achieved by the best performing 12%
  - Additional reductions based on costs and non-air quality impacts

Case-by-Case MACT

- Section 112(j) - the "permit hammer" provisions
  - Occurs if MACT is not promulgated within 18 months of statutory deadline
  - Permit contains case-by-case MACT

- Section 112(g) - sources with increases in HAP emissions
  - Changed operations
  - Offset and *de minimis* allowances

Goals of the Program

Overall Goal

- Reduce risks to the population and minimize environmental impacts from air toxics

Current GPRA Goal

- By 2010, reduce air toxics emissions by 75% from 1993 levels to significantly reduce the risks of the population to cancer and other serious adverse health effects caused by airborne toxics

Future GPRA Goal *(draft)*

- By 2015-2020, eliminate unacceptable risks of cancer and other significant health problems from air toxics emissions for at least 95% of the population and substantially reduce or eliminate adverse effects on our natural environment

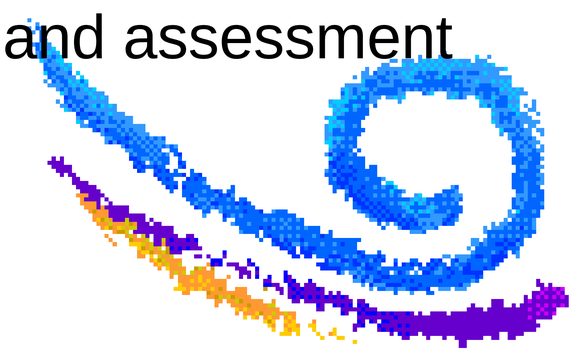
Status of the Air Toxics Program

The Air Toxics Program

- Designed to characterize, prioritize, and equitably address the serious impacts of hazardous air pollutants on public health and the environment through a strategic combination of:
  - regulatory approaches
  - voluntary partnerships
  - ongoing research and assessments
  - education and outreach

Components of the Air Toxics Program

- **Source-specific standards and sector-based standards**
  - MACT (Sections 112 and 129)
  - Residual Risk
  - Utilities Study
- **National, regional, community-based initiatives to focus on multimedia and cumulative risks**
  - Integrated Urban Air Toxics Strategy
  - Great Waters
  - Mercury initiatives
  - PBT and TMDL initiatives
  - Clean Air Partnerships
- **National air toxics assessments (NATA)**
  - Emission inventories
  - Monitoring network
  - Air quality, exposure, and risk modeling
  - Ongoing research on effects and assessment tools
- **Educational outreach**



The MACT Program

MACT: Section 112 Program

- 188 hazardous air pollutants initially listed in CAAA
- 174 source categories listed by EPA
- Source categories divided into bins:

BIN	STATUTORY DATE	STANDARDS / SOURCE CATEGORIES	PROPOSED TO DATE	COMPLETED TO DATE
2 year	11/15/92	2 standards 6 source cat.	____	2 standards 6 source cat.
4 year	11/15/94	18 standards 40 source cat.	____	19 standards 40 source cat.
7 year	11/15/97	30 standards 41 source cat.	____	24 standards 35 source cat. 5 delisted
10 year	11/15/00	62 standards 94 source cat.	4 standards 4 source cat.	1 standard 1 source cat. 2 delisted

MACT: Status of Section 112

- Completed all 2 and 4 year standards
  - 21 standards covering 46 source categories
- Completed all 7 year standards
  - 24 standards covering 35 source categories
  - Delisted 5 source categories
- Initiated work on all 10 year standards
  - Total of 62 standards covering 94 source categories
  - Promulgated 1 standard covering 1 source category
  - Proposed 4 standards covering 4 source categories
  - Delisted 2 source categories

MACT: Section 129 Combustion Standards

- Municipal Waste Combustion
  - Initially promulgated December 1995
- Hospital / Medical / Infectious Waste Incineration
  - Promulgated September 1997
- Promulgate by November 2000:
  - Industrial / Commercial Waste Incinerators
  - Small MWC Units

MACT: Implementation Status

- Regions have delegated 69% of the major source standards and 49% of area source standards

- The "apparent" national aggregate MACT compliance rate is 36%

The Residual Risk Program

Residual Risk: Purpose

- Assess post-MACT risks from source categories

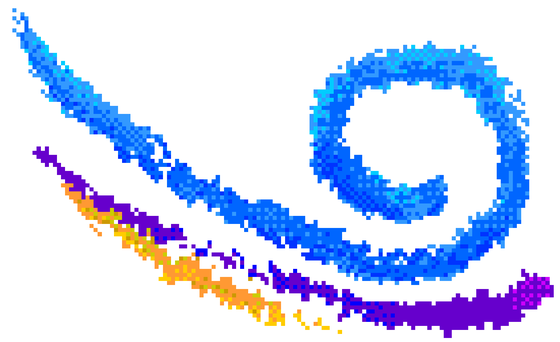
- Set additional standards, if needed, to protect public health with an "ample margin of safety"
  - within 8 years of MACT promulgation

- Prevention of "adverse ecological impact" with consideration of other factors

- Report to Congress March1999

Residual Risk: Need for a Risk Management Framework

- Source categories will likely require unique analyses
  - Data availability and quality
  - Various types of source categories
    - number of sources
    - HAPs emitted
- Enable consistent decision process



Residual Risk Management Framework

- Will Be
  - A broad conceptual framework which identifies:
    - decision points in the process
    - major inputs into these decisions
    - type of information required to support each decision
    - guidance for decision making under uncertainty

- Will ***NOT*** be
  - A prescriptive decision tool outlining rigid criteria for each decision

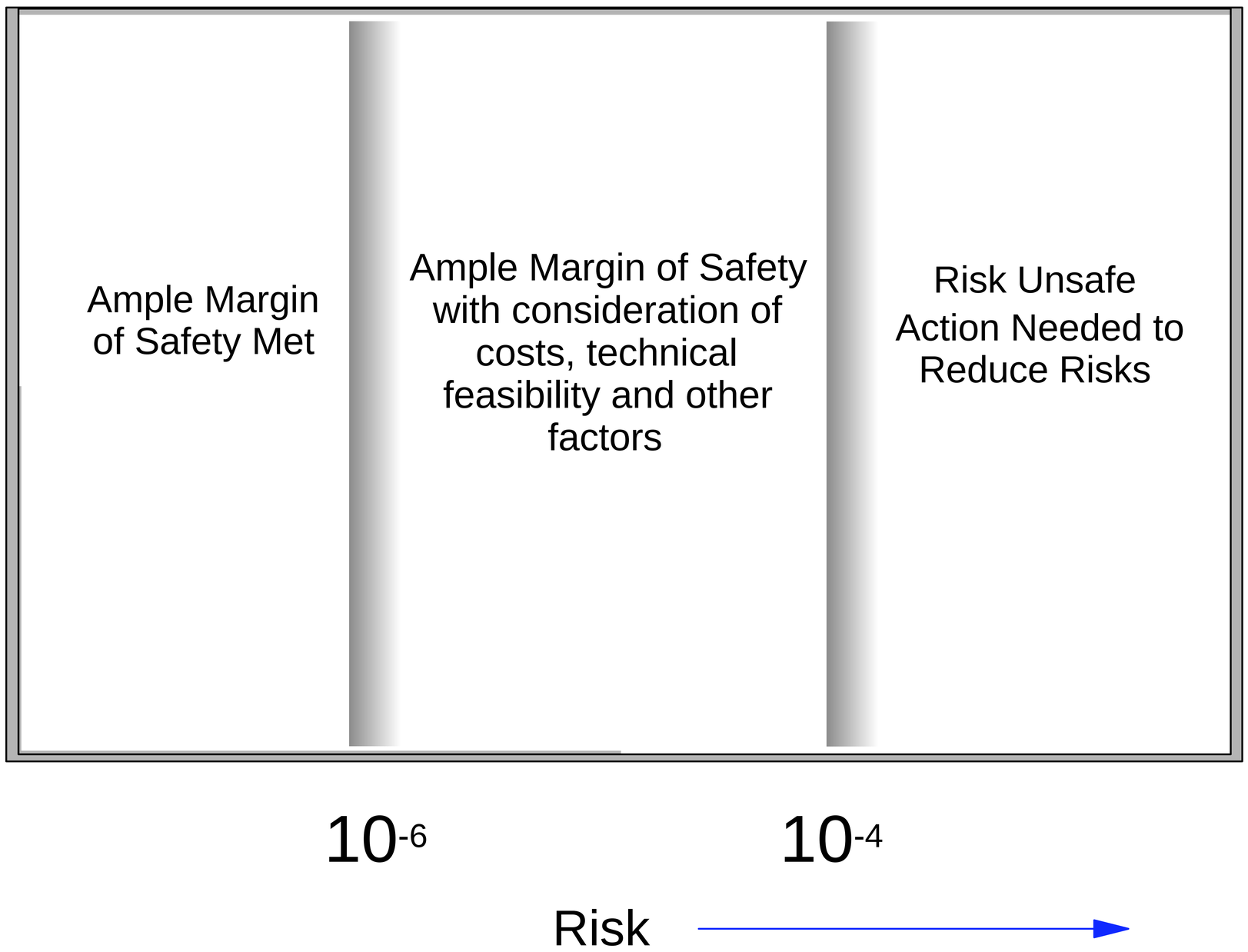
Residual Risk: Risk Management Decisions

- Protection of public health with "ample margin of safety"
  - Cancer (Benzene NESHAP Framework)
  - Noncancer
- Prevention of "adverse environmental impact" with consideration of other factors

Residual Risk: Benzene NESHAP Ample Margin of Safety (AMS) Framework

- CAA maintained the use of AMS as applied in Benzene NESHAP
- Two-step process
  - safe or acceptable
  - ample margin of safety
- Currently defined for Benzene NESHAP (linear carcinogen)
- Must apply principles to others as well
  - non-linear carcinogen
  - noncarcinogens

Residual Risk: Overview of Benzene NESHAP Relevant Risk Ranges



Residual Risk: General Framework for Assessment Process

- Use a tiered approach to conducting assessments:
  - Data Collection & Problem Formulation
    - initial scoping plus data collection and re-scoping, as necessary, prior to each level of analysis
  - Screening Analysis
    - conservative, relying on readily available information and defaults
  - More Refined Analyses
    - Increasingly more realistic and more resource intensive
    - Utilize different tools or data

Residual Risk: 2 & 4 Year MACT Standards

- Due 2001
  - Coke Ovens*
- Due 2002
  - Dry Cleaning*
  - EO Sterilizers*
  - Gas Distribution*
  - Halogenated Solvent Cleaning*
  - Industrial Cooling Towers*
  - Magnetic Tape*
- Due 2003
  - Aerospace Manuf.
  - Chrome Electroplating*
  - Petro Refineries*
  - Polymers and Resins II*
  - Sec. Lead Smelters*
  - Shipbuilding
  - Wood Furniture
  - Marine Vessel Loading*
  - HON*
- Due 2004
  - Printing/Publishing
  - Polymer & Resins I, IV
  - Offsite Waste

Residual Risk Assessments -- Status

- 12 Source Categories have been started
  - Screening assessments underway on 8
  - More refined assessments underway on 4

Residual Risk Assessments: Status *(continued)*

- Characteristics of source categories vary
  - number of sources range from 23 to >5,000
    - majority have fewer than 100 sources
  - number of HAPs range from 1 to over 100
    - 3 have > 50 HAPs
  - Carcinogenic and noncarcinogenic HAPs emitted
  - Some potential for multipathway exposures

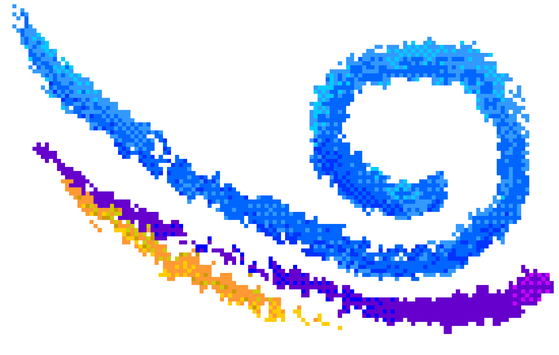
Residual Risk: Status --Toxicity Data

- Hierarchy of data used for developing dose-response data for risk assessment
  - IRIS
  - ATSDR
  - California EPA
  - HEAST
  - Other governmental agencies

- As a result, we have toxicity data for 150 of the 188 HAPs

Residual Risk Assessments: Status -- Data

- Data used
  - MACT Background Information Document, NTI
  - State and Regional Offices
  - Industry
- Requests for data from industry made for 6 source categories
  - data have been provided from industry on 2 source categories
- In the absence of data:
  - use conservative assumptions
  - use Section 114 authorities



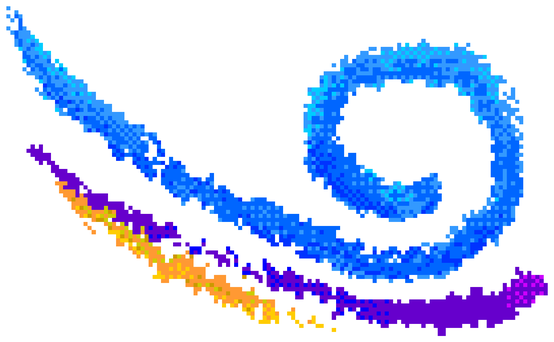
Residual Risk: Status -- Tools

- Range of tools used in risk assessments
  - SCREEN 3 modeling conducted for 3 source categories
  - ISC/HEM applied to 6 source categories, to date
  - IEM applied to 1 source categories date, 4 more anticipated
  - TRIM being developed and will be available on a limited basis in the next year

Great Waters Program

Great Waters Program

- Section 112(m) Requirements
  - Deposition assessment
  - Periodic Report to Congress
  - Regulatory determination
  - Monitoring for Great Lakes, Chesapeake Bay, and Coastal Waters
- 15 Pollutants of Concern
  - Mercury, lead, and cadmium
  - Nitrogen compounds
  - POM / PAHs, dioxins, and furans
  - PCBs and 7 banned / restricted pesticides



Great Waters Program: Accomplishments

- Two Reports to Congress
  - Issued May 1994 and June 1997

- Adequacy determination supporting Section 112 authorities
  - Issued March 1998

- Third Report to be issued summer 2000

Great Waters Program: Current Directions

- Primary focus on nitrogen and mercury

- Developing monitoring capabilities of NEPs
  - workshops and special studies

- Developing analytical tools and legal strategies

- Building partnerships

Great Waters Program: Current Projects

- Great Lakes monitoring / studies
- Hg Deposition and TMDL Pilot
  - Florida Everglades and Devils Lake, WI
- Monitoring Network - Long & Short Term
- Air Emissions from Concentrated Animal Feeding Operations (CAFOs)
- Develop better communication tools
  - website for better data access
  - handbook for air dep studies
- Develop Action Plan
  - complete action plan in 2000 and begin implementation in 2001

Utility Study

Utility Study

- Study completed in February 1998
- Currently collecting information to support regulatory determination
  - issued information collection request (ICR) to utility industry
  - conducting (through ORD) analysis of potential control technologies
  - continue analysis of health-related issues
- Regulatory determination by 12/15/00

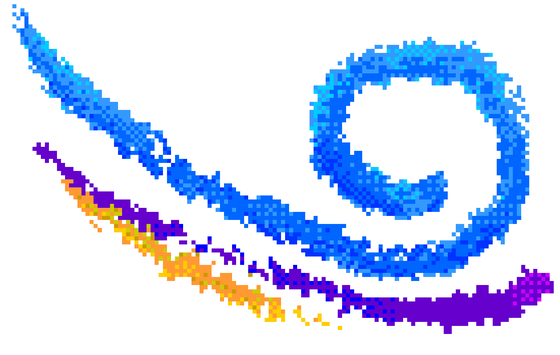
Urban Air Toxics Strategy

Urban Air Toxics Strategy

- Final Strategy - Issued July 19, 1999
  - list of 33 HAPs
  - list of 13 new area source categories
  - 202(l) standards and low sulfur diesel regulations
  - activities for residual risk and 10 year MACT

- Initiate mobile source standards first
  - propose July 2000
  - promulgate December 2000

- Area source standards by 2004



Urban Air Toxics Strategy: Goals

- 75% reduction in cancer "incidence"
  - *Scope: national, from all stationary sources looking at all HAP*
- "Substantial" reduction in noncancer "risks"
  - *Scope: national, only from area sources, looking at all noncarcinogenic HAP*
- Address disproportionate risks

Urban Air Toxics Strategy: Progress Assessment

- Iterative Analyses
  - Preliminary -- comparison of 1990 and 1996 emissions and ambient monitoring data
  - Periodic assessments -- initially based on 1996 emission inventory
- Allow for evolution of methods over time
  - Improved tools and data
  - Progression from screening level to more complex assessment

Urban Air Toxics Strategy: Area Source Standards

- Options: How to develop standards
  - MACT
  - Traditional GACT
  - Flexible GACT
- Options: Where standards apply
  - National standards apply everywhere
  - National standards apply only in urban areas
  - State and local standards

Urban Air Toxics Strategy: Other Activities

- Identify research needs
- Work in partnerships with State, local and tribal governments to develop programs that address goals of urban strategy
- Federal Advisory Committee Act (FACA)
- Initiate pilot projects with the Office of Indoor Air
- Education and outreach

Indoor Air

Indoor Air

- Both indoor and outdoor air exposures to air toxics are important

- Indoor air and outdoor air are interdependent
  - outdoor air toxics set baseline level indoors
  - outdoor air toxics infiltrate or are ventilated indoors
  - indoor emissions are ventilated outdoors

Indoor Air: Integrated Strategy

- For meaningful reduction of risks, we must address ***BOTH*** indoor and outdoor sources of air toxics

- Will do this through:
  - timing of joint strategies to reduce air toxics
  - joint communications and coordination
  - joint project(s)
    - pilot study in one community

Mobile Source Strategy

Mobile Source Strategy

- Mobile sources are significant contributors to urban toxics emissions inventories

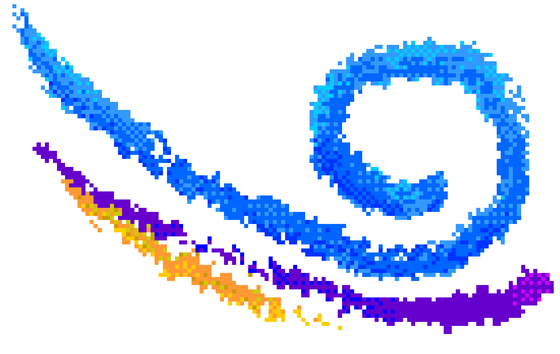
- Many compounds and elements are known to be emitted by motor vehicles

- There are 3 primary ways to reduce emissions of mobile source air toxics:
  - fuel controls
  - engine controls
  - reduction of vehicle miles traveled

Mobile Source Strategy: Standards Under Development

- Heavy Duty Diesel Engines (mid 2000)
  - final rule that reconfirms 2004 standards for heavy duty diesels
  - proposal to control sulfur in diesel fule fuel and establish more stringent standards for heavy duty vehicles and engines

- Tier 2 Rule (finalized December 1999)
  - new stringent emission standards and gasoline sulfur controls from light duty vehicles and trucks



Mobile Source Strategy: Standards Under Development *(continued)*

- Tier 3 Non-Road Diesel
  - propose late 2000/finalize 2001
  - non-road diesel fuel controls and emission standards for non-road diesel engines
- Section 202(l) Rule
  - propose July 2000/finalize December 2000
  - will designate motor vehicle air toxics and consider control options

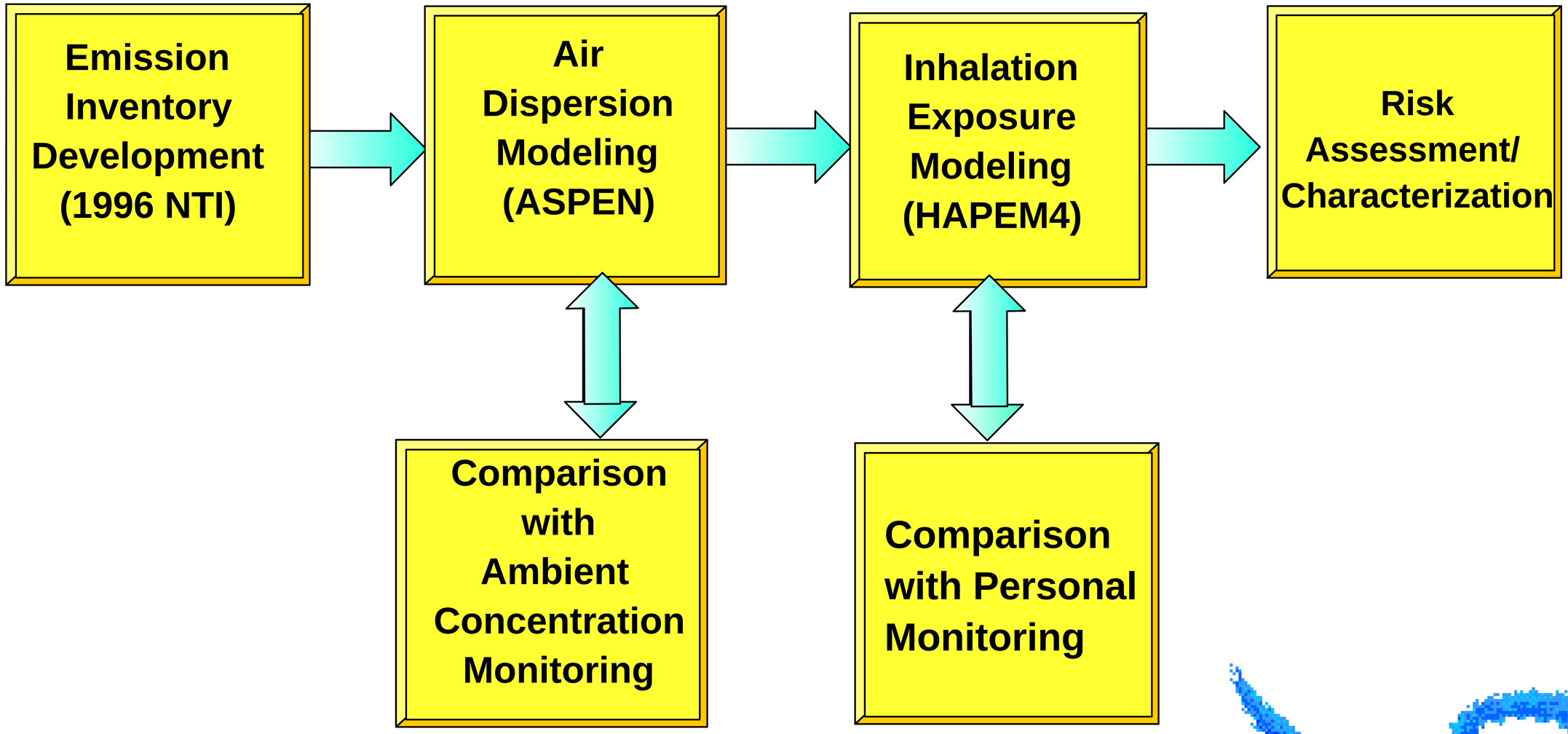
National Air Toxics Assessment (NATA)

NATA: What is it?

- Development of analytical tools to:
  - identify areas of concern
  - improve characterization of risks and risk reductions for stationary and mobile sources
  - track our progress and prioritize efforts

- To be accomplished through:
  - emission inventories development
  - monitoring networks
  - modeling

NATA 1996 National Air Toxics Screening Assessment



NATA Screening Assessment: What it is...

- Identification of priority hazardous air pollutants and sources
- Identification of potential national scale air toxics problems
- Prioritization of future data collection and localized modeling efforts
- Allow for better analyses
- Measure progress against national goals
- Help set research agenda

NATA Screening Assessment: What it is NOT...

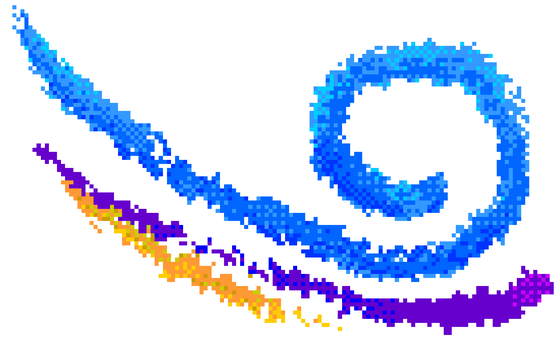
- *NOT* called CEP2
- *NOT* the only thing included under the NATA umbrella
- *NOT* being used to make specific regulatory decisions

NATA Screening Assessment: Scope and Schedule

- National Effort: Continental US, Virgin Islands, and Puerto Rico

- Addresses emissions for 33 priority HAPs plus diesel PM

- Phased roll-out
  - 1st - Air Quality
  - 2nd - Exposure Models
  - 3rd - Risk Analysis



NATA Screening Assessment: Scope and Schedule *(continued)*

- Provide initial result summaries (emissions and ambient estimates) and model-to-monitor comparisons on website spring 2000

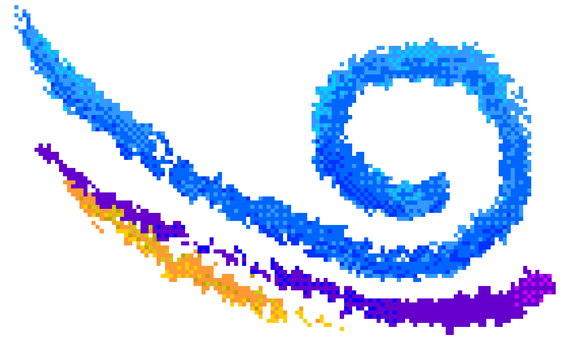
- Provide draft final results (exposures and risks) on website summer 2000 for public and peer review

- Final peer reviewed assessment by December 2000

NATA: Public Health Implications

- Scope
  - 33 Urban HAPs
  - County resolution
  - Inhalation only (not multipathway)
  - Chronic effects only (not acute)
  - Characterization **will** address these issues qualitatively

- Purpose
  - Screening-level assessment



NATA: Risk Characterization Outputs

- **WILL** produce:
  - County-level cancer risk and noncancer hazard for each HAP
  - County-level cumulative risk and hazard for each HAP
- **WILL** be clearly identified as "screening-level" for use in:
  - Setting the research agenda
  - Measuring progress against national goals
  - Identifying priority HAP & sources

NATA: Risk Characterization Outputs *(continued)*

- **WILL NOT** produce:
  - Reliable risk estimates below county level
  - Information on hot spots
- The screening-level characterization should **NOT** be used for:
  - Comparing risks at the local scale
  - Regulatory decision making
  - Showings of harm or absence of harm

Partnerships

Develop Partnerships

- State / Locals / Tribes
- Other EPA Offices
- Other Health Agencies
  - OSHA, CDC, NIEHS
- Industry
- Public Interest Groups

For More Information on Air Toxics

- Visit the following websites:
  - EPA's Office of Air and Radiation (OAR)
    - www.epa.gov/oar
  - Unified Air Toxics Website (UATW)
    - www.epa.gov.ttn/uatw
  - OAR Policy & Guidance Website
    - provides access to OAR rules, policies, and guidance documents
    - www.epa.gov/ttn/oarpg

In Summary

- Continue to implement air toxics program to meet GPRA goals...
  - complete 10-year MACT standards
  - effectively implement and enforce standards
  - continue residual risk analysis of promulgated rules
  - develop / implement urban based strategies
  - develop data and tools to enhance our capabilities to characterize risk and monitor progress
  - look at multi-media impacts
  - partnership fund
  - mobile sources strategies / standards
  - indoor air strategies